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The Forester

A monthly magazine, devoted to the care and use of forests and forest trees and related subjects

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THE AMERICAN FORESTRY ASSOCIATION.

ORGANIZED APRIL, 1882.

INCORPORATED JANUARY, 1897.

The object of this Association is to promote:

1. A more rational and conservative treatment of the forest resources of this continent.
2. The advancement of educational, legislative and other measures tending to promote this object.
3. The diffusion of knowledge regarding the conservation, management and renewal of forests, the methods of reforestation of waste lands, the proper utilization of forest products, the planting of trees for ornament, and cognate subjects of arboriculture.

Owners of timber and woodlands are particularly invited to join the Association, as well as are all persons who are in sympathy with the objects herein set forth.

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Gen. FRANCIS H. APPLETON, Boston, Mass., President.
Sir H. G. JOLY DE LOTBINIÈRE, Quebec, Canada, First Vice President.
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Recording Secretary,
WASHINGTON, D. C.

ANNUAL DUES . . . $ 2.00.
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Meeting of the American Forestry Association.

At ***BOSTON, MASS***—In the latter part of August, in connection with the semi-centennial meeting of the American Association for the Advancement of Science.

VISITORS AT BOSTON.—The Massachusetts Forestry Association extends its greetings to all members of the American Forestry Association who intend to visit Boston in August. The Massachusetts Forestry Association and the Appalachian Mountain Club of Boston will join in extending hospitalities to the visitors during the week of August 22 to 27. The rooms of the Appalachian Mountain Club in the Tremont Building (which is almost directly opposite the Horticultural Building where the meetings of the Association will be held), will be open daily, and visitors are invited to use them for reading, writing or as a place of social meetings. As an additional attraction it may be said that the view from the Club's windows is in itself quite worthy of a call.

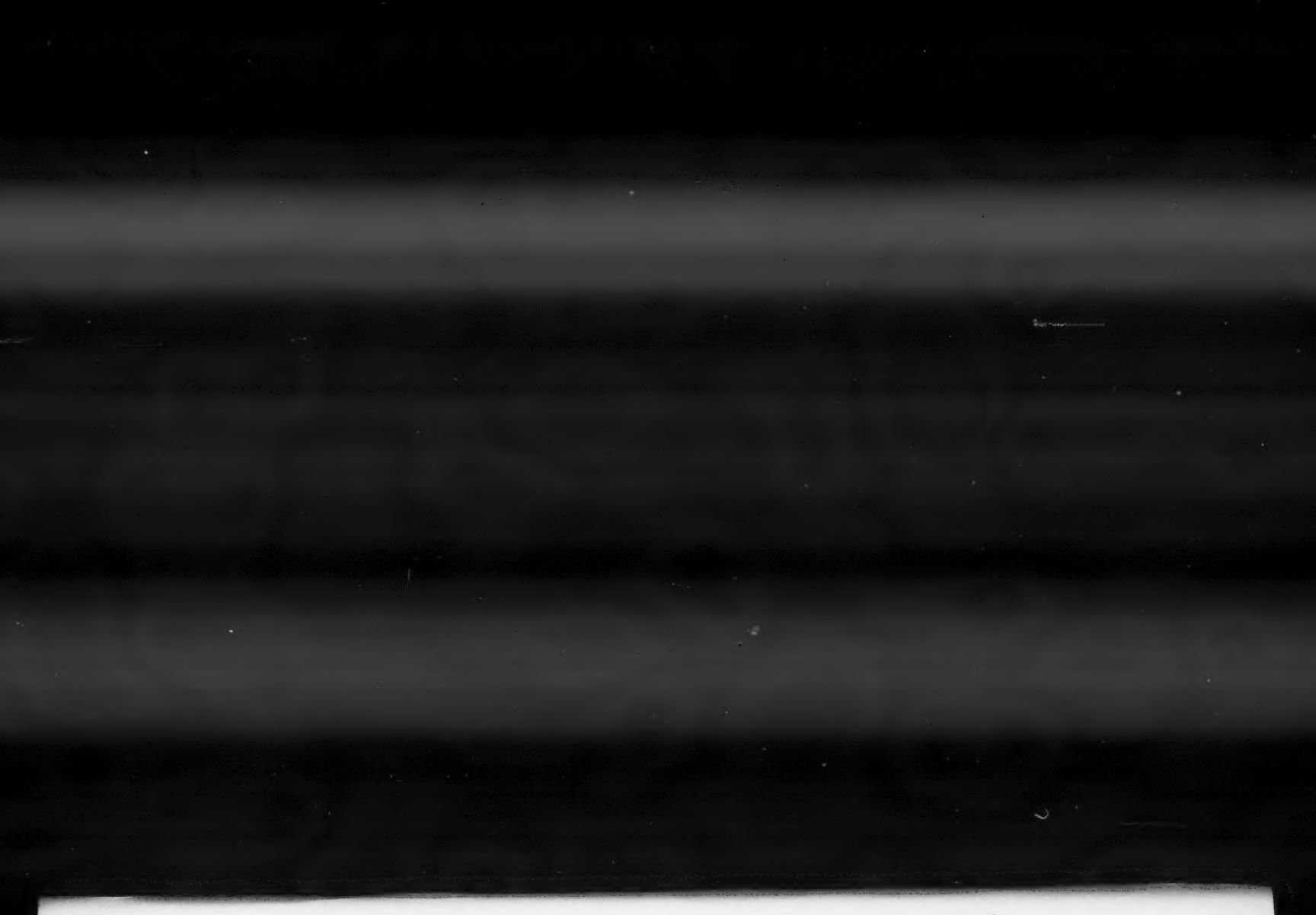
A local committee is in charge with Gen. Francis H. Appleton, Boston, Mass., chairman.

It is desirable to know beforehand how many may attend the meeting, in order to make proper arrangements for reduction in transportation, hotel rates, excursions, etc.

ALL members who are likely to attend will please notify the undersigned of the fact.

GEORGE P. WHITTLESEY,
Recording Secretary.

The Forestry Association is reluctantly compelled to announce the abandonment of the Omaha meeting. Mr. F. W. Taylor, who was chairman of the committee in charge of the same, has been unable through the press of many and important duties to give this matter his personal attention, and it is now too late for others to work up a programme.



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THE FORESTER will be furnished free of charge to all active and honorary members of the Association. State Forestry Associations affiliated under Article III of the Constitution will receive the journal at club rates.

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Note change in the meetings of the American Forestry Association.

The Long Leaf Pine Supplies.

The White Pine of the North is going, almost gone. Even the lumber trade journals, who, ten years ago, ridiculed the Denudatics and harped at the inexhaustible supplies, know it now.

The Longleaf Pine of the South, a timber supplying an entirely different want, the most magnificent material for heavy wood construction in the world, is going the same way. This pine, differently from its Northern congener, which occurs mostly in mixed forests, forms, or formed, pure forests in which it was almost exclusively the only species over a vast territory covering thousands of square miles.

If there were any resource of nature inexhaustible this vast accumulation of many centuries of wood-growth would, only thirty years ago, have appeared to warrant such an epithet. To-day even the casual observer can see that this rich inheritance cannot last beyond a short span of time. It is so rapidly being drained that the end is visible almost calculable. Nobody can predict the end with any definiteness, for, although we may approximate the annual consumption, which is now a round four billion feet, (but of course will constantly grow,) on the other hand, nobody knows the amount of standing timber, and the estimates are of the crudest. Such an estimate was attempted by the Division of Forestry, as published in that splendid monograph on the Southern Pines, by Dr. Chas. Mohr, and in Sen. Doc. 40, in which the entire coniferous supply of

the South was set at three hundred billion feet, or, if we credit the Longleaf Pine with one-half that amount, there would not be forty years' supplies of timber at present rate of consumption ready for the axe in existence.

A later attempt to get at the probabilities in this matter adds fifty per cent to this figure. Yet, whether it be forty years or sixty years—and with our development the period will necessarily have the tendency to be much shorter—it is time now to consider the means of preventing such exhaustion and securing the maintenance of this most valuable resource. This can be done, not as everybody now may have learned, by enjoining the woodman to "spare that tree," for the trees grow to be cut and used, but by taking measures to secure, or at least not to prevent, their reproduction.

It is not the logging and lumbering and the turpentine orcharding that are reprehensible, but the manner in which these are done and the treatment to which the woods are subjected during and after these processes. What this treatment is like may be learned from the article on another page by Dr. Chas. Mohr, the veteran pioneer advocate of forestry in the South, who has for years sounded the trumpet of alarm and attempted almost single-handed to awake the people of the South to a more rational use of their splendid inheritance.

Although the area occupied by the Longleaf Pine is vast—much larger than that on which the White Pine held sway—the amount of serviceable material per acre is smaller than that which the Northern Pine has yielded. The trees are shorter and fewer to the acre, the Longleaf Pine being one of the most light-needing species, and hence occurring in open growths. Hence, to cut the four billion feet probably twice the area has to be cut over which would have sufficed for Northern Pine, and this accounts for the rapidity with which seemingly the supplies are waning. Sooner or later exhaustion of the virgin timber was bound to come. But a resource which like our forests is capable of reproduction is also really inexhaustible, provided we do not prevent its reproduction and keep consumption and reproduction apace.

Such reproduction in the pinery takes place readily without any effort of man. It is only necessary to keep fires out and hogs in. "Hogs and logs don't grow together" in the Longleaf Pine district, the large sweet seed not only, but the succulent, carrot-like root of the young seedling is too toothsome for the rooter.

The young seedlings grow so slowly during the first five to seven years that their terminal bud is hardly raised more than three to four inches above ground, and hence the danger of destruction by fire or hogs continues for a long period of infancy. After the seventh year the growth proceeds rather rapidly and the Pine would readily hold its own against usual dangers. To be sure, the timber we are now cutting has taken mostly over two hundred years to grow, but with changed conditions and requirements, centenarians will in the future satisfy our needs.

The Forest Reservation Policy Stands for the Present.

As we are going to press we learn that the Conference Committee on the Sundry

Civil Bill has finally agreed to abandon the Senate amendments which were designed to abolish the forest reservations proclaimed on February 22, 1897. While there is still the necessity for both Houses to agree to the Conference report, we may take it for granted that the report will be accepted and the reservations are saved for the present.

The Association and its friends are to be congratulated at this success over a strong opposition. The individual efforts of members, as well as the persistent and splendid campaign of the press, backing up the conferees of the House and their advisers, Messrs. Lacey and McRae, have undoubtedly been responsible for the victory.

It will, however, be needful for the Association to watch closely the movements during the coming year, for the opposition will not rest satisfied that the forest reservation policy is now really unalterably entrenched. What is needed now is the establishment of a judicious and rational administration of the reserves, with due regard to the local interests involved, and as rapid as possible a segregation of the truly agricultural lands which should be returned to the public domain for entry. We should acknowledge that the opposition is justified if the reservations are to be unprotected and left without adequate administration and become useless and worse than useless by non-use.

News and Editorial Comment.

On July 1, Mr. Fernow having resigned his official position as Chief of the Division of Forestry, which he has held for twelve years, also resigned the Chairmanship of the Executive Committee of the Forestry Association, and withdraws with the present number of THE FORESTER from its editorial management to devote his whole attention to his new duties at Cornell University. Mr. Fernow has served the association actively as an officer without compensation since 1883; first as its Secretary until 1888, and since then as Chairman of its Executive Committee.

Mr. F. H. Newell has resigned as Secretary of the Association, in order to reduce his many duties of a similar nature, having served the Association for four years. Through his systematic and methodical efforts the membership of the Association was increased from 405 in 1894 to 820 in 1898.

Mr. Whittlesey, Recording Secretary, has been appointed by the Executive Committee to act as Corresponding Secretary, and Mr. C. C. Swisher has been appointed Treasurer in order to relieve Mr. Whittlesey of the duties of that office which he had also filled hitherto.

Between sixteen and eighteen years ago, a Mr. Lewis Hamblen, then an old man (now dead), planted on a gravelly slope back of Marston's Mills, West Barnstable, Mass., several acres with

Pitch Pine seed, by making with a short-handled hoe a hole in the sod into which the seed were dropped and covered. The trees are now fifteen to twenty feet high, and from five to eight inches in diameter.

Readers who are placed in position where they have to discuss the evils of woodland pasture will welcome the article by Mr. Ashe on another page, which brings definite proof of the poor policy of woodland pasture from the standpoint of the cattle-breeder himself and the money loss occasioned by it.

In the *Portland Oregonian* for May 21, 1898, Hon. John Minto of Salem, Ore., reprinting Judge Waldo's article on The Cascade Forest Reservation, published in the May number of THE FORESTER, dissents from Judge Waldo's indorsement of the Cascade Forest Reserve and from the whole plan of Federal management, maintaining that only the States themselves can properly manage the forest and other public lands within their borders. After quoting the abstract of regulations for forest sheep-grazing in the Cascades proposed by Mr. Frederick V. Coville (see page 141), Mr. Minto says:

"These are the rules suggested by Mr. Coville, as Special Agent (Botanist) of the Department of Agriculture, and indorsed and recommended by Gifford Pinchot as special agent of all the reserves. I quote them to show that in its incipiency this system, called by its friends a 'rational national forest policy,' is in its nature imperialistic, not republican; that, as compared wtih the State's right and duty to protect, preserve and guide the development of our grazing and forest resources, it is sure to generate discontent and dissatisfaction in those having to submit to such conditions, with virtually no control over the men who dictate and enforce them, whereas I believe fully that if the National Government would give the management of the public lands now in forest and the lands suitable for pasturage only, under strictly defined conditions, it would be preservative of the forest where forest culture is the highest possible use to which the land can be put, to improve the pasture lands where improvement is possible, the policy would become a nursery of patriotic spirit as the donation and homestead laws have been and are.

"I regret to differ with Judge Waldo, with whom I have passed many pleasant days in the Cascade Mountains, which we both love, but I think as a pioneer legislator the introduction of his 'memorial No.8' was the proper way in which to begin any reserve to be forever segregated from the power of local taxation, which is a constitutional function of the State that cannot be legally exercised as Mr. Coville suggests.

"This is written to draw the attention of citizens, representative men especially, to the influence this question may have upon the future harmony between the States. It never would have been needed if this reserve question had been left to the citizenship of the States most vitally interested. But taken up and pressed by men at and near Washington, ignorant of local conditions, this great reserve is laid just one-half of its width too far east for a forest reserve, making it more valuable for its pasturage than it will be for its forest for 100 years to come, if ever."

Regulations for Sheep-Grazing in the Cascade Reserve.

The following is the abstract of regulations proposed by Mr. Frederick V. Coville in his report on Forest Growth and Sheep-Grazing, the publication of which was briefly noted in the April number of THE FORESTER, and to which Mr. Minto refers on page 140 of the present issue:

In order to sum up the conclusions of this investigation in a form showing concisely what action should be taken by the Interior Department to inaugurate a satisfactory system for the regulation of sheep grazing in the Cascade Reserve, an abstract of the proposed plan is given below. It must not be forgotten that this report, both in the matter of the extent of damage done to the forests by sheep and in the system proposed for its regulation, applies only to sheep-grazing in the Cascade Range Forest Reserve, and that very different findings of fact and propositions for regulation might have been submitted had the area in question been situated under different climatic conditions, or had it contained other types of soil or other kinds of forests, or had been subject to sheep-grazing for a longer period, or had other equally important conditions affected the problem.

The steps necessary to a solution of present difficulties by the Interior Department are as follows, and these steps, in order to save and perpetuate the timber supply and the water supply of middle Oregon, should be taken at once:

1. Exclude sheep from specified areas about Mount Hood and Crater Lake.

2. Limit the sheep to be grazed in the reserve to a specified number based on the number customarily grazing there.

3. Issue five-year permits allowing an owner to graze sheep on a specified tract, limiting the number of sheep to be grazed on that tract, and giving the owner the exclusive grazing right.

4. Require as a condition of each permit that the owner use every effort to prevent and to extinguish fires on his tract, and report in full the cause, extent and other circumstances connected with each fire.

5. Reserve the right to terminate a permit immediately if convinced that an owner is not showing good faith in the protection of the forests.

6. In the allotment of tracts secure the co-operation of the wool growers' associations of Crook, Sherman and Wasco counties through a commission of three stockmen, who shall receive written applications for range, adjudicate them, and make recommendations, these recommendations to be reviewed by the forest officer and finally passed upon by the Secretary of the Interior.

7. Ask the county associations to bear the expenses of the commission.

8. Charge the cost of administration of the system to the owners in the form of fees for the permits.

8. If the wool growers decline to accept and to co-operate in the proposed system, exclude sheep absolutely from the reserve.

10. If, after five years' trial of the system, forest fires continue unchecked, exclude sheep thereafter from the reserve.

Sand-Dune Reclamation on the Pacific Coast

In a recent article* I described the position and extent of the principal sand-dune areas of the Pacific Coast, making mention simply of those smaller areas of shifting sand found usually on the south side of the openings to the three principal harbors of California, namely, San Francisco, San Diego and Humboldt Bay. Although these areas are relatively small they have received more attention than have the more remotely situated but larger areas of Washington and Oregon.

How it was that the Argonauts selected the seat of the Spanish town of Yerba Buena as their metropolis of the west, is hard to understand unless it be because

*The Sand Dunes of the Pacific Coast. The Forester, Vol. III.

the Spaniards had settled there before them. Certain it is, they could hardly have found a more forbidding spot. Close by and along the bay shore were salt marshes, back of this a narrow strip of sandy, more or less level ground, and beyond, hills on hills, all of sand-dune formation and already more or less reclaimed by the native species. Farther westward, beyond what is now aristocratic Nob Hill and upper Haight Street, it was mainly a series of shifting sand dunes.

With the Argonauts came wealth, later culture, and soon it was recognized that historic old Portsmouth Square and the two or three other small parks already set aside were not sufficient for the demands of such a city as San Francisco was destined to be. With nothing but sand hills in the vicinity, a park had to be built on sand hills. The city obtained title to a strip of land lying between the bay and ocean, yet close enough to the center of population that it is cheaply and quickly reached from all parts of the city. Work was begun in 1869 and has continued steadily since that time; as the city has grown the appropriations have increased so that now they are as much as $200,000 yearly. The results are certainly to the credit of the city. There is a charm that distinguishes Golden Gate Park from other large city parks. Perhaps it is the freedom from convention and restraint, perhaps the curious mixture of flora as is only possible in a California garden.

The present total area of the park is 1,040 acres; of this 500 acres has been sufficiently reclaimed to be planted with coniferous species. It is this portion of the park which the visitor sees as one of the sights of the Golden Gate. Here are the swan ponds, the grand boulevard with its bicycle and foot paths; the open-air concerts draw great crowds to the park every Sunday. The children's quarter with its donkey paths, "merry go round" and athletic field is an admirable feature. The conservatory is well kept and contains the choicest collection of conservatory plants on the coast.

As the visitor rides through the park out toward the Cliff House and Sutro Heights by the sea he sees still great stretches of sand, some loose, some already held in place by the long stems and rhizomes of the sand grass (*Arundo arenaria*). This is the preparatory stage in park making. The method in brief is as follows: The shifting sand is seeded with *Arundo arenari,* and this is allowed to grow for two years when the ground is sufficiently held in place to begin the second stage of reclamation which consists in planting arboreal species, generally the Monterey Pine (*Pinus insignis*) and the Monterey Cypress (*Cupressus macrocarpa*); with these are also planted the smaller *Leptospermum lævigatum* and *Acacia latifolia.* These species in two or more years complete the reclamation, and then attention is directed to making up all losses of plants and encouraging growth as much as possible. It is a significant fact that the two coniferous species found to be so useful in the sand reclamation are each native only in a very small area in and about Monterey, some miles farther south on the coast.

The entire cost of reclamation by these methods does not average more than $50 per acre, which considering the immense value of the land when reclaimed is a very small sum. By far the larger portion of the sand area about the Golden Gate has already been reclaimed by this or similar methods, so that now there is not more than 1,500 acres without planting of some sort. These results certainly bear evidence to the fact that such lands can be reclaimed profitably in this country as well as in France, and it would be far better if some of the would-be ranches of the timber districts of the Pacific Northwest would leave the virgin forest stand, save their immense outlay of labor and devote some of their attention to the strip of sand dunes along their coast. FRANK H. LAMB.

Chinese Forestry.

In an interesting private letter a correspondent gives glimpses of Chinese

forestry, which will be of interest to our readers. He says:

"The Chinese government has made no recent movement to organize a forestry department. They have such a department, in name only, and the rules regulating the cutting and growth of timber were written some two thousand years ago, and officials were appointed in the various provinces to enforce the same, but now nothing remains of this most startling move but the rules on the statute books. Confucius in his writings, some 500 B. C., called attention to the waste of timber and suggested that the magistrate of each district be instructed to plant a certain number of trees each year. There is no literature in the native language on the subject of forestry.

"I have no doubt but it would be possible to get the co-operation of China in ascertaining the supply of timber, as the government is in a mood to grant whatever the foreigners demand, particularly if the demands are accompanied with a liberal display of naval power; but you may be sure that whatever data is collected by them will be absolutely worthless. As a nation and as a people they have no conception of the word accuracy. Their estimates of the population of the native cities are inaccurate to extremes, as, for instance, they state that the population of Tientsin is between five and nine hundred thousand, a statement which is sufficiently close for the Oriental brain; and it is the opinion that any estimate they would be disposed to make in regard to timber areas would follow on much the same lines of accuracy.

"From travelers I have reports of vast forests in the mountainous districts of northern and eastern Manchuria, in some parts of eastern Mongolia and in the western and southwestern provinces. These districts or provinces are thinly settled and far away from the coast where the timber is most in demand. H. E. M. James, in his book, the 'Great White Mountain,' tells how his party marched for days through the unbroken forests of eastern Manchuria.

"Nearly all the timber used on the China coast is imported from America, Japan or the Strait Settlements. Most of the railroad ties used are from the Pacific slope, as this timber seems to stand the dry climate of northern China better than that from other countries. In case some of the railroad projects are floated that are now on the market there will be a large demand for ties in this country. In tenders submitted last summer for ties, the prices were about seventy tael cents, or forty-eight cents gold, put at the wharves in this port.

"To sum up, I should say that China has everything to learn and nothing to impart about forestry, and can only serve as an example of the evil consequences to climates and rivers by neglect of forests and allowing them to disappear.

E. G. ADAMS, JR.

TIENTSIN.

Acre Yield of White Pine in Pennsylvania.

It is a matter of economic importance to know the amount of lumber which a well managed forest will furnish at any given period in return for the expenditure incurred in its management. But since we do not have such forests to give answer to the question the next best thing is to find out how much a vigorous forest produces when left to itself and not exposed to any extraordinary dangers or damage. Besides the acre measurements afford an interesting study of typical forms of primeval forest conditions. The kind of trees found associated in the forest, their distribution over the ground, the light available for each of the species, the share each kind bears in the make-up of the forest—whether by numbers or size—these points, in connection with the nature of the soil and its surface cover, topography, elevation, exposure and drainage conditions, indicate the adaptability of one or the other species, and exhibit their sylvicultural requirements.

Wet and cold grounds are unfavorable to White Pine; it occurs in such localities rarely, and then only in single individuals. Such places seem to be more adapted for the growth of Hemlock, which, together with few Spruces, forms there the bulk of the forest.

Dry grounds with thin soils are also unfavorable for White Pine, although here it adapts itself more readily than on cold and wet grounds. The ridgelands, therefore, contain few White Pine scattered among the hardwoods, which though small in dimensions are dominating in number. The hardwoods also predominate over the White Pine on ridges with deep, fresh and well drained soils. It is true that such ridges are seldom to be found, but when found they offer the most favorable conditions to the growth of various hardwoods, which establish themselves rapidly in great numbers, crowding out the White Pine from the otherwise suitable habitat.

The character of the forest cover on ridgelands, the relative dominance of the kind of trees, the amount of merchantable Pine to be found there, may be fairly indicated by the measurements taken on a sample acre, which was staked off on the ridgeland at Hay's tract, Jefferson County. The mixed growth consisted of Beech, White Oak, Maple, Hemlock and scattering White Pine. A number of very young and small Beech, with some Maple, constituted the moderately dense undergrowth. The soil was a clayey loam of a reddish brown color, deep, fresh, well drained, with two to three-inch mold on top and a surface cover of abundant leaves and ground Hemlock. The sub-soil was a laminated shale of indefinite depth. The crown cover varied in density, but 0.7 of the normal may be taken as a fair average. The age of the White Pine varied from 230 to 240 years.

There was a total of 165 trees on the acre,* of which in numbers 71 per cent were hardwoods (79 Beech, 10 Maple, 7 White Oak and 2 Chestnut), 22 per cent Hemlock and only 7 White Pine (11 in in number). The Pine, though small in number, has attained a size which leaves all the other kinds of trees on the acre far behind. The Pine here is really the dominating tree, while the hardwoods appear rather in the capacity of an underwood.

The volume of boles of the 11 Pine equaled 2,933 cubic feet; the volume of boles of the remaining 154 trees equaled 5,526 cubic feet. The Pine, then, constituted 35 per cent of the total yield of the acre.

The 11 Pine on the acre were felled and sawed up into logs which scaled 16,741 feet, B. M.

The yield of White Pine on ridgelands with thinner and dryer soils is approximately the same as that given above, though the number of Pine per acre is usually larger, while their dimensions are comparatively smaller. The forest cover of such ridgelands is similar to that under discussion, except that in a good many instances on ridges over 2,000 feet above sea, like those, for instance, at the head of Hyner's Run, in Hyner, Clinton County, the Hemlock is usually replaced by Pitch Pine (*P. rigiaa*) and the hardwoods are still smaller in size.

The forest cover of the rocky slopes and the amount of merchantable timber per acre to be found there may be illustrated by the measurements taken on two acres, which were staked off on a steep slope along the second right-hand branch of Hyner's Run. The forest consisted of Hemlock intermixed with White Pine, with scattering Black Birch, Yellow Birch and occasional Oak, Chestnut and Maple. The three latter species were usually found near the top of the slope, while the Birch, especially the Black Birch, were situated at the foot of the slope near the stream. The moderately dense undergrowth consisted mainly of very small Hemlock, mixed with small hardwoods above named, few Willow and Black Cherry. The rocks had a three-inch mold on top and were covered

* Young and small trees under three inches in diameter, breast high, constituting the undergrowth, were not taken into account.

with Laurel, Green Brier, Rock Fern and in openings with Blackberries. The density of crown cover varied from 0.4 to 0.5. The White Pine were from 230 to 260 years old.

There was a total of 96 trees to the acre, of which 60 per cent were Hemlock, 16 per cent hardwood and 24 per cent White Pine—47 in number. The Hemlock on the rocky slopes are dominating in number, giving the impression of a Hemlock forest, among which the Pine and the hardwoods appear to be interspersed. But the impression is radically changed when the volume of boles of the species is considered. The volume of boles of White Pine on the two acres equaled 13,672 cubic feet; the volume of boles of all the trees on the two acres equaled 23,000 cubic feet. The Pine, then, constituted 60 per cent of the total yield per acre, which yield in lumber amounted to 66,000 feet, B. M. Dividing the 66,000 by 240, the average age of the stand, we find that rocky slopes produced under such conditions annually 275 feet, B. M., per acre.

The character of the forest on comparatively elevated grounds, where White Pine usually occurs in larger bodies, may be fairly illustrated by the measurements of the following two acres in Clearfield County: One acre was staked off on somewhat elevated ground, bordered on the southwest by a creek. The mixed growth consisted of Hemlock, White Pine and few Maple, Beech and Birch. The undergrowth, moderately dense, consisted of small Hemlock, Beech, with a few Birch and Cucumber. The soil was a clayey loam of a yellow color, medium grain, deep, fresh, well drained, with two to three-inch mold on top and a surface cover of scanty leaves, Fern, Tea Berries and scattering Dogwood (also Laurel on the north side and in the northeast corner). The subsoil was a laminated shale of indefinite depth. The density of crown cover was 0.7 (in places 0.8). The age of both White Pine and Hemlock varied from 240 to 260 years.

The Pine, 37 in number, constituted only 28 per cent of the total number of trees on the acre. The volume of boles of White Pine equaled 9,028 cubic feet; the volume of boles of all the trees equaled 15,686 cubic feet; thus the White Pine constituted 60 per cent of the yield of the acre, which yield equaled 90,103 feet, B. M. The acre, then, produced annually 360 feet, B. M.

The other acre was staked off in a stand of trees, the density of whose crown cover equaled 0.5, while the soil, moisture and all other forest conditions were practically the same as those described above. The Pine here bears practically the same proportion to associated species as found in the more dense forest. The same is noticed with regard to the share each species has in the total yield of the acre. The volume of boles of White Pine on this acre equaled 7,269 cubic feet; the volume of boles of all the trees on the acre equaled 11,224 cubic feet; thus the Pine constituted 65 per cent of the total yield of the acre, which yield amounted to 66,900 feet, B. M. An acre of moderately dense mixed growth of Hemlock and Pine produces, then, annually 270 feet, B. M.

A. K. MLODZIANSKY.

Growth of White Pine in Massachusetts.

Mr. Nathaniel Morton sends the following summary, supplementary to his interesting article in our June number, on the growth of White Pine (Fixing Up a Wood-Lot in Massachusetts—Trimming White Pine):

"The average age of the 38 White Pine trees in 1891 was 36 years.

"The average gain in 7 years in area of horizontal section 5 feet from the ground was 38 7-10 per cent.

"The greatest gain in any tree in area of section was 109 square inches, in a tree 32 years old.

"The least gain in any tree in area of section was 20 square inches, in a tree 35 years old.

"The largest per cent of growth in any tree in 7 years was 85 per cent.

"The smallest per cent of growth in any tree in 7 years was 13 per cent.

"It seems reasonable to assume that the increase in height and in length of limbs would make the increase in wood growth in 7 years 50 per cent, or half as much as had grown in the first 36 years.

"Assuming that the growth of these 38 trees was not above the average growth of all the Pine trees on the lot, for every 100 cords of standing wood in 1891 there are now 150 cords, an annual gain of about 7 per cent.

"The largest circumference growth in any one tree in the 7 years was 12¼ inches, instead of 11¾ inches, as previously stated."

Present Condition of Forests of Longleaf Pine in Alabama and Mississippi.

This part of the maritime Pine belt, extending from the alluvial lands of the Mississippi River to the fertile uplands of middle Florida, and to the mouth of the Suwanee River, covers an area roughly estimated at about 29,000 square miles. The denudation of this area by the exploitation of its timber resources, and in connection with turpentine orcharding, has been in progress since the Census year of 1880 with astonishing rapidity in all sections connected by water or rail with the markets. The shipments of timber and lumber from Pascagoula, Miss., to foreign and domestic ports have increased from 60,000,000 feet in 1880 to nearly 130,000,000 feet in 1893; from the port of Mobile, Ala., from 22,525,000 feet in 1880 to 150,000,000 feet in 1896. The exports from western Florida (Pensacola) show much smaller increase, from 202,000,000 in 1880 to 295,000,000 in 1892. This slower increase is mainly due to the early depletion of the forests in the near-by lumbering districts, which was but slightly overbalanced by the supplies brought from the remoter districts near or beyond the Alabama and Florida State line The traveler from the North, impressed with accounts of the vast timber wealth of the Southern States, finds himself disappointed in seeing, along the highroads of traffic, the scanty, devastated remainder of the grand forests, whether his way lead him through the Pine region of the Atlantic Seaboard, or through the Pine forests west of the mountains to the Gulf. When first operated the railroads were lined by a seemingly unlimited primeval forest of Longleaf Pine and the timber lands were held at mere nominal prices. Easy of acquisition, these lands were rapidly invaded by the lumbering industry, particularly in the eastern Gulf States, with their splendid bays and safe roadsteads offering unequaled facilities for the shipment of their product to distant markets. The highest standard of quality was set upon the timber and lumber exported, in fact only timber of the best quality was considered, at the mills, as merchantable; no log was classed as such which would not cut a board 12 inches wide, all heart, free from knots or any other blemish, for the length of 20 feet. After a cull of such standard the number of trees remaining next in dimension held out the prospect for harvests of similar supplies within a comparatively short time. They were in fact, culled at short intervals to meet the home demands for timber of smaller dimensions, particularly in the shape of crossties, and for other purposes of an inferior kind. In 1880 the supplies of timber in this region appeared to the great majority of people simply inexhaustible. On this point public opinion has during late years undergone a great change. At present the fact is generally recognized that for some years past the comsumption of timber has far outstripped spontaneous reproduction, and that, under a corresponding increase of the present rate of consumption, the practical exhaustion of the forests of Longleaf Pine is a matter of but few decades. In the region under consideration large areas of the forests were worked for their resin long before they came within reach of the lumbering industry. In many districts tens of years passed before the timber

of the abandoned turpentine orchard was cut for the mill. During this length of time the surviving timber suffered deterioration by wind shake and rot, and by injury from insects, such damage causing considerable loss in sawing, and leading to the absolute condemnation of bled timber. Timber lands in those days were, however, held at such low value that in spite of the serious interference of this industry with the lumbering interest, turpentine orcharding outstripped the former vastly in its progress. Under these conditions no tree was tapped which would not admit of a box 14 inches wide and 7 inches deep. This standard measure then in vogue would exclude any tree below 14 inches in diameter, breast high, from being bled. At the beginning of the present decade, in the lower part of the coast Pine belt from North Carolina to Florida and westward to the Mississippi River, by far the larger proportion of the available timber standing was already bled. With the increasing scarcity of the round timber under the control of the manufacturers of lumber, and with the extension of the logging camp from the vicinity of the river or railroad to the remoter parts of the forest, the bled timber disappeared rapidly from the old turpentine orchard and, in spite of the prejudice existing against it, it was sawn indiscriminately with the round timber and the products were thrown together upon the market. Since it has been proven by the United States Timber Investigations that the bled timber suffers in no way in its physical qualities for which the wood of the Long Leaf Pine, and of its nearest ally, the Cuban Pine, is most esteemed, provided it is conveyed to the mills soon after it has been abandoned in the turpentine orchard, mostly all is now tapped and the resinous products made useful before it is felled for the mill.

With the construction of the steam-equipped tramroad from one township to another, penetrating the forest, frequently, for distances exceeding a score of miles; and with the introduction of the modern dry-kiln, which has become common during the past ten years, the methods of logging and of turpentine orcharding have changed. Now no tree furnishing a stick of timber that will serve at the mill for stuff of the smallest dimensions is spared by the axe of the logger. The remainder left consists of trees little over 8 or 9 inches in diameter, breast high, besides the old trees affected by red rot or with their timber otherwise defective. The small timber and the refuse of the larger trees near the facilities for transportation were now resorted to. All along the railroad lines the remaining trees are boxed to the utmost extent, incurring the danger of their being prostrated by the wind, or killed, before the four seasons, during which they are worked, are over. By such proceeding the final doom of the forest is sealed, and the prospect for its recuperation is wiped out. The small trees, weakened in their support, are bound to be blown down or killed by the fires, which are started one season after another, to clear the ground in the turpentine orchard of inflammable litter and debris. Others fall a prey to the ravages of the bark beetles, and the old trees, already impaired in their vitality, can not survive for a greater length of time the injuries inflicted upon them. With their death the reproduction of the species fails, and no young growth is to take the place of its predecessors which have been destroyed by fire. Soon the aspect of the country, in the lower part of the coast Pine belt under consideration, is changed. In the low damp Pine barrens, with a soil of loamy sands and a clay subsoil, tall broomsedge grasses (*Andropogons*), with coarse, deep-rooted, perennial herbs; yellow-eyed grasses (*Xyris*), Blackrushes (*Rhyncospora*), Nutrushes, and tall Compositæ, such as Goldenrods, Blazingstars, Asters, Eupatoriums, Sunflowers, etc., etc., cover the ground, imparting to the country the aspect of savannas. On the rolling pine lands of similar soil conditions studded with little bosquets of Black Jack, of Spanish Oak of inferior size, Chincapin, and

various Haw trees (*Cratægus elliptica, Co. flava*) On the poor sandy upland, destitute of a clay subsoil, and on the barren ridges the Pine is replaced by low stunted upland Oaks, such as the Forkleaf Barren Oak (*Quercus catesbeyii*), Blue Jack (*Q. brevifolia*), forming low bushy woods. On the low sandy flat woods along the shores of western Florida the dense covering of the Saw Palmetto shades the ground closely, leaving but scanty room for the scrub of the Myrtle Oak, Live Oak, and more rarely for the Sand Pine (*Pinus clausa*). Each one of these phases presents a picture of utter desolation and barrenness, which at present is frequently met with along the highroads of travel through the lower division of the coast Pine belt wherever the land *is too poor* for cultivation, and scarcely affords sustenance to the famished cattle which, uncared for, have to shift for themselves upon lands which should be left forever under the cover of the Pine to be of any use. On the most extensive scale, the forecast of the two latter phases depicted above, presents itself along the railroad leading from Tallahassee to Carabelle, on the desolate shore of Apalachicola Bay. At the distance of about a dozen miles from Tallahassee a wide plain, with a soil of loose white sand, is entered upon, extending from the swamps of the Apalachicola River west to the St. Marks River. At first slightly undulating, it soon becomes perfectly level. Outside of the numerous swamps overgrown with a maze of evergreen shrubs and small trees, mostly Ti-ti (*Cliftonia uniflora*), Leatherwood (*Cyrilla*), Dahoon Holly (*Ilex cassine*), Wax Myrtles (*Myrica*) with some scattered Cuban Pines towering above them, the plain is covered with an open forest of Long Leaf Pine and Cuban Pine of inferior size, the latter becoming more frequent as the coast is approached. Passing over this road in 1895, shortly after its opening to traffic, there were to be seen several large sawmills in operation along its line; at present they are found dismantled on account of the failure of the timber supply, which, it seems, had fallen far short of estimates. The large complex of these pine lands, embracing about 125,000 acres, is now to be worked solely for its resin. The turpentine orchards are subjected to the closest management; trees barely of the dimensions to support a box of smallest size and affording a minimum profit in being worked, are bled, the few seed-bearing trees that escape the axe of the logger cannot survive for any length of time the severe treatment inflicted, and the young growth will be totally destroyed by fire by the time the turpentine orchards are abandoned, with no chance left for its reproduction by spontaneous sowing. The fact that this coast tract will be converted into a desolate wilderness asserts itself in every direction, a destiny which will inevitably be shared by the rest of this plain in its whole extent. That under management, with an eye to the maintenance of their resources, these poor pinelands might be made the source of a continual and profitable income is clearly shown by the thrift and vigor of the young Pines which accidentally have found a refuge from destruction by fire, as for example between watercourses and intervening swamps. Under the same protection the young growth of the Cuban Pine, on lands of similar character in the coast plain of Georgia, would soon cover the plain. On the poor sandy soil under cover of the litter of pine straw, serving as a mulch to prevent the dissipation of the needed soil moisture, the frugal Pine would, from the inherent vigor of its growth, produce in the space of 40 to 50 years a forest that could be profitably worked for its resinous products and a quarter of a century later furnish timber of good quality. CHAS. MOHR.

Mobile, Ala., 1898.

Æsthetic Forestry.

The Park and Out-Door Art Association held its second annual meeting at Minneapolis, Minn., June 22 to 25. The well-arranged program provided an

agreeable mixture of sessions in-doors, when papers and business were discussed, with daily drives and excursions, during which the remarkable park work of the Twin Cities was inspected. Among the interesting papers was one on "Æsthetic Forestry," by Dr. B E. Fernow, in which the author approached his favorite topic from the standpoint of the beautiful, using the system of forest park reservations about Boston as the text and illustration of his remarks He pointed out the fact that Americans have thus far failed to recognize forestry as a useful occupation, though they are not behind Europeans in appreciation of forest beauty. While forestry is an industrial rather than an æsthetic art, the forester appreciates fully the charms of his woodland. The park gives pleasure by its artistic elements, the forest by its natural elements, and here the principle is to let nature largely take its course. Forest roads can be made with due regard to artistic requirements, and these may also be fully satisfied while using axe and saw for the improvement of the growing crop and the harvesting of the trees that are mature. Variety in the composition of the forest pleases, yet the planting tool must be used with circumspection, and introduced species must be in harmony with the existing growth. The forester, though he sacrifices to some degree the picturesque, as represented in crooked and gnarled Oaks and Birches, cultivates another form of beauty in the lofty boles which he creates in his trees. And throughout his forest everywhere is manifest the beauty of system and of order, none the less artistic because the utilitarian object is apparent.

Forest Destruction and Water Flow.

AUSTRALIA

J. G. O. Tepper, a naturalist connected with the Museum of Adelaide, South Australia, writes to one of our Vice Presidents:

"We are in the third year of abnormal drouth, and as I have fifty years of experience and keen observation of natural phenomena behind me in this land, I can not help ascribing the change of climate into an Eremian (desert) climate to the insane wholesale clearing and destruction of the perennial vegetation by axe and fire, viz., adopting the methods good (?) in Europe under opposite conditions. The worst is that the Australian climate will scarcely permit re-foresting on account of temperature, drouth and porous soil, as is possible in countries which have winter snow."

WISCONSIN.

The Duluth *Evening Herald* some time ago brought the following:

Messrs. Flood and Smith, members of the board of public works, accompanied by Major Sears, went to Fond du Lac yesterday to examine Mission Creek. This little stream has been carrying sand and earth into the channel of the St. Louis River, against the wishes and judgment of the Government engineer. The council has neglected to appropriate money to remedy that condition of affairs and Major Sears has been on the verge of reading the riot act, as it were, and resorting to stern measures.

The members of the board, after their trip, believe that Major Sears does not consider the matter so seriously as the reports of his assistants caused him to believe it. Anyway, at a small expense, the board figures that the banks of the Mission Creek canal can and will be raised in a couple of places and the overflows which have done the damage be effectually prevented in the future.

This stream is the first of the several small branches of the St. Louis River to give trouble by washing. The country about its head is becoming quite bare by cutting and burning. Mission Creek falls some 400 feet in its whole length—3 miles. The greatest trouble is to the town—Fond du Lac—on the banks of Mission Creek and is the thing they hooted at me for prophesying in 1891

H. B. AYRES.

Results of Forest Administration.—IV.

SWITZERLAND.

The model republic of Switzerland, with its free institutions reaching back

into gray antiquity, with an area less than one-third that of Wisconsin, and with about 3.2 million out of the total of 10.2 million acres as unproductive alpine wastes, has early learned the importance of the "Schutzwald," the protective forest. At present the entire country is divided, with respect to the forests, into two districts, the high alpine regions being denoted as the "Federal forest districts," including about half of all forests in which all forest property, irrespective of ownership, is proclaimed "Schutzwald," or protective forest, and where the federal government exercises authority over the forests, prohibiting certain dangerous modes of treatment, preventing any devastation and encouraging, by various means, the work of reforestation. Where the private owner or village is too poor or unwilling to carry on the work, even when state subvention is offered, the republic exercises the right of eminent domain, if necessary, to obtain control of the land and then carries out the necessary improvements. On the whole, this work has progressed very slowly.

With the alpine Swiss the avalanche and the mountain torrents are not subjects of the story book, but are dread realities as terrific as the earthquake. For centuries the Swiss boy has been taught the importance of these forests, and for many years the little federation has passed laws to insure their existence. On the whole the forests cover nearly two million acres, or about 20 per cent of the total and 27 per cent of the productive area of the little territory. Of these woods so far only about 4 per cent is in the hands of the canton government, 66 per cent belongs to villages and about 30 per cent to private owners.

There has just been published a forest map of Switzerland, which was made on the scale of 1:100000, then reduced to 1:250000, a model of fine map-making. From it we learn at a glance that the proportion of forest area in Switzerland is for a mountainous country relatively low, not much over 20 per cent. The high alps of Wallis, Bern, Uri and Glarus especially show only sparsely the green spots devoted to wood growth. On the other hand the northern hill lands and low mountains and the territory of the Jura Mountains, Basle, Schaffhausen, Solothura, Zurich, are well wooded, with over 30 per cent each.

The total forest area of the cantons is a little over 2,000,000 acres, of which not quite 1,250,000 acres are under the federal forest laws.

There is a forestry school at Zurich in connection with the Polytechnic Institute, and in connection with the school, which is officered by three professors, an experiment station in which two assistants are employed.

The federation employs a forest inspector with two assistants and two clerks.

The cantons employ 111 foresters of technical education, and the villages, cities and other communities have their communal forests managed by thirty-five skilled forest officers

Of the different owners it is particularly the private holders who have failed in the care of their forests. In spite of all laws, the woods had to help out at every occasion When the harvest was bad a little cut of timber had to help balance accounts, and when straw was scarce the forest floor was robbed of the all-important litter. In spite of repeated and often severe legislation and regulations, some of which date back several centuries, the government of Switzerland to-day is confronted by its unsolved forest problems, fully if not more serious than ever before, and the expositions of the matter by Dr. Fankhauser and others point out clearly that imperfect subventions or state aid, and few isolated cases of expropriation and state intervention, are not going to save Switzerland from a fate similar to that of Alpine France, and that nothing short of state ownership of all "Schutzwald" is likely to insure to this little mountain republic the much-needed protection against catastrophes from avalanche and flood and to furnish to it the much-needed supply

of timber and fire wood, which in spite of so much forest land has, to quite an extent, been supplied by the neighboring states, as appears from the following for the year 1890. During this year Switzerland paid for wood, woodenware and coal the net sum of $6,200,000 to Germany, $1,360,000 to France, $760,000 to Belgium, $740,000 to Austria; its total import of these goods during the year having been valued at $10,800,000.

Notwithstanding the rather unsatisfactory condition of forest affairs, there are some very noteworthy exceptions, and one of the most conspicuous and best described of these is that of the city of Zurich, where for more than a thousand years the citizens have held uninterrupted possession of their most important forest property, the "Sihlwald." The exact manner in which they acquired this forest can no longer be traced, the evidences of early ownership consisting in directions, formulated by the council, concerning the distribution and prices of wood, but from the year 1308 a full and undisputed ownership can be proven. The Sihlwald, covering the steep hillsides of the Sihl Valley, measures only about 2,500 acres, was as late as the middle of the 17th century a mixed forest of Beech, Fir and Spruce, but has gradually changed into an almost pure Beech forest, with about 20 per cent of other hardwoods and some conifers. As early as 1280 the citizens in their council passed definite regulations as to how the wood should be distributed and at what prices it should be sold to the citizens of Zurich.

As early as 1314 a forester or separate and responsible officer existed, and from the year 1342 the "Sihlherr," or master of the Sihl forests, was a member of the city council, whose function consisted in the superintendence of the forest and forest operations.

A well considered use of the forest is clearly expressed in the regulations of 1417, and a system of management of the forest similar to that of the present day dates back nearly to the time of discovery of the Western World.

Not only were the citizens of Zurich aware that an unreasonable cutting would cripple their forest and reduce the amount of yearly growth, but their good sense soon taught them about how much the woods could replace each year and they decided as early as 1422 to prescribe the amount that might be felled. In this way an alpine district of only 2,500 acres has been kept productive, has been logged continuously every year for over a thousand years, and is to-day in better shape, grows more wood, and brings a better income to the citizens of Zurich than at any time in the past. What an advantage this property has been to this town, how much it contributed to its independence, what a storehouse in times of dearth, etc., may be inferred from the fact that the cut for this piece of woods has been over 1,000 cords per year for more than two centuries, and that at present there may be cut over 1,500 cords per year without diminishing the enormous wood capital of about 8,000,000 cubic feet standing on these 2 500 acres of land.

The age at which the Beech is harvested is generally about 80–100 years, the average size of the timber is rather small, generally little over 12 inches in diameter, and over 60 per cent of the cut is firewood. So far this has paid very well, as is evident from the fact that Zurich obtains a net income of about $8 to $9 per acre a year, and is able to pay $10 to $11 per acre for supervision, logging, etc., of which only about 4 per cent falls to planting, sowing and drainage work. Nevertheless it is believed that the reversion of the forest into a mixed stand of conifers and hardwoods will be better, and propositions and plans for this change are under consideration. There is also a new forestry law for the federation under consideration.

Forest Conditions in Western Washington.

Western Washington, often called the Olympic Peninsula, is without doubt the

largest tract of uniformly forested land in the United States. Including the watersheds of all the streams flowing into the Pacific, it comprises an area of about four million acres. Excepting a few small prairies and the higher snow-clad mountain tops, there is but little of this whole area but is covered with a heavy growth of timber. Along the streams, on the narrow bottom lands, there is usually a heavy growth of alder and a little cottonwood; besides this, there is generally an almost impenetrable undergrowth of Salmon Berry (Rubus spectabalis), Devil's Club (Fatsia horrida) and various species of Vaccinium. This same characteristic undergrowth is also found on the uplands.

The main forest cover consists of four species of conifers: Douglas Fir (Pseudotsuga taxifolia), Tide Land Spruce (Picea sitchensis), Red Cedar (Thuja plicata) and the Hemlock (Tsuga mertensiana). Along the coast the North Coast Scrub Pine (Pinus contorta) battles against the relentness sands that ever sweep inland. In some of the northern swamps is a large coned form of the Mountain Pine (Pinus monticola), and this species occurs again in the higher mountains, together with the beautiful Patton's Spruce (Tsuga pattoniana), the Alaska Cedar (Chamæcyparis nutkatensis), the Yew (Taxus brevifolia), the Alpine Fir (Abies lasiocarpa), and the mountain form of the Juniper (Juniperus communis alpina).

Of the lumber-producing trees, Douglas Fir is the most widely distributed. It grows best on the higher ridges, at some distance from tide lands. Since its introduction into commerce many years ago, it has become a favorite timber wherever obtainable. It is light, of good texture and is next to Oak in strength. It is the principal timber cut by the mills on Puget Sound, and, until a few years ago, was the only timber considered of any value. The introduction of the Tide Land Spruce into the market dates back about five years. It is a colorless, tasteless and odorless wood; of close grain, soft, but very tough. On account of its light weight, and consequent low cost for transportation, it has mainly supplied the Eastern trade. It is a favorite lumber for interior finish and for car building. The distribution of the Spruce is very limited, growing only on the low flat lands close to tide water. Pure forests of this species are seldom seen, and in its best localities it will not average over thirty per cent of the entire forest cover.

Hemlock, although a very desirable timber, is not cut. Unlike the Eastern species, it has a fine grain, is durable, is nearly as hard and strong a timber as Douglas Fir and without odor or taste. It has a universal distribution, being almost invariably mixed in varying proportions with Fir, Spruce and Cedar. Red Cedar (Pacific Arbor-vitæ), in some river valleys close to the ocean, forms almost pure forests, but the greater part of it is found scattered with the other species in nearly every locality. It produces a soft, light, red timber of rather coarse grain; used by the Indians for their dug-out canoes. There is but little call for it as lumber, except for finishing purposes, but the entire available supply is now demanded for the manufacture of the celebrated Washington Red Cedar shingles.

The average amounts of Fir, Spruce and Cedar, in feet per acre, vary greatly in different localities; the very best Fir tracts will sometimes cut as high as 100,000 feet, B. M., per acre, while ordinary claims of 160 acres will average about 40,000 feet, B. M., per acre. Spruce, when growing by itself, averages less than Fir, and the best Cedar tracts will cut about 40,000 feet, B. M., per acre, while Hemlock, if cut, would produce as much. In mixed forests the yield of Spruce is about 10,000 feet, of Fir 30,000 feet, and among this there will be 10,000 to 20,000 feet of Hemlock. This will apply to tracts not far from tide water In the case of tracts on the higher slopes, the Spruce will be replaced by an equal amount of Cedar.

The price of timber claims varies from $5 to $15 per acre. Stumpage sells from

75 cents to $1 per thousand feet, while the price of logs delivered at the mill varies from $4.50 to $6 per thousand Throughout Washington there are about 130 mills cutting either shingles or lumber These mills in 1897 cut about 400,000,000 feet of lumber and 2,860,900,000 shingles.

A careful study of the conditions as they now exist reveals the fact that the forest resources of the State are being wasted. In the woods the entire amount of Hemlock is either allowed to rot or is destroyed by fire, after the other timber is removed. Of the other varieties only the largest and finest logs are cut, while of these only the portions free from knots and swells are taken to the mill. The high stumps, containing from 500 to 2,000 feet, and the tops above the first limbs, are likewise destroyed by fire or allowed to rot. Careful estimate has shown that at least one-third of the tree is left in the woods. When there is added to this the entire yield of Hemlock and the rough trees which are not touched, some idea of the waste may be obtained. But great as this may be, it is not the worst. Invariably after a region is "logged over" in this way, fire destroys whatever small trees remain, burning the accumulations of centuries and killing the young growth. These fires are applied from year to year until the ground becomes little better than a waste.

As long as it is unprofitable for the lumbermen of Washington to utilize a larger portion of the forest and to economize in any way, we can hope for no improvement in the situation Nothing can correct the evils now rampant in the woods but a rise in the price of lumber, and this can only be done by restricting the available supply of timber land. This in time can be accomplished in two ways: first, by capitalists, who recognize the value of the forest and are able to buy and hold the same until prices are commensurable with its real value; or, second, by Government restriction. This the Olympic Forest Reservation may accomplish for Western Washington, but it is a long distance in the future. What is needed is the withdrawal from entry of all lands more valuable for their timber than for agricultural purposes. Preparatory to this action, to secure the best results and retain the confidence of the people, there must be formulated a definite forest policy under the supervision of a national forest bureau. A policy allowing entry to lands agricultural in character, providing for the rights of miners and prospectors, granting the sale of stumpage at a proper valuation whenever the demands of commerce, settlers or the welfare of the forest require it.

FRANK HAINES LAMB.

Hoquiam, Wash.

Book Notices.

We are in receipt of a most interesting and valuable contribution to the technical forestry literature of this country by Dr. C. A. Schenck, on "*Our Yellow Poplar, Notes and Tables Showing Contents and Value of Poplar Logs and Poplar Trees,*" being the result of a more or less exhaustive investigation into the rate of growth and its financial aspects of the Tulip tree (*Liriodendron tulipifera*), commonly known by lumbermen as Whitewood or Yellow Poplar. We regret that lack of space and time prevent us from reviewing, as it deserves, in more detail this presentation of an interesting problem. But we cannot forego the pleasure of expressing our satisfaction that such work is being done, although we are inclined to question some of the results and some of the deductions. We are astonished to find Tulip tree grow as slowly as it is made out to grow, requiring under average conditions 200 years to make a diameter of two feet We have never seen such slow-grown Tulipwood and believe that at least in early life Tulip trees, if not overshaded, grow at least as rapidly as White Pine, and believe that hence under the conditions which the forester can create its production would be much greater than that found by Dr. Schenck, and place an entirely different face upon the question of profitableness.

This profitableness is calculated upon the assumption that logging costs $9, $10 or $11 per thousand feet. It would hardly require much argument or proof that at such figures logging cannot be profitable, much less forestry, which means logging with special regard of what follows.

In general the calculations seem to prove that forestry does not pay at all on those mountains in North Carolina and put the matter in even worse light than we believe it is; for if the land has no value—it has none except for tree growing, the price paid for it is no criterion of its value—and trees are proportioned to net revenue, the woods will produce from time to time logs, even if no care is bestowed upon them, and a net revenue of some kind can be obtained from them, for even now they sell at $1 per tree in those same mountains. There are, from the forester's standpoint, some fallacies, we think, in the basis and manner of calculating the value of a tree which are misleading, when the calculation makes a tree of 100 years worth not more than twenty-five cents at best. We believe a more careful analysis of his results will persuade Dr. Schenck that his views regarding profitableness of Poplar-growing will have to be modified in several directions.

The Timber Trees and Forests of North Carolina. Bulletin No. 6, North Carolina Geological Survey. Raleigh. By Gifford Pinchot and W. W. Ashe.

In our last issue we reviewed a report on the forests of northern Wisconsin, and now comes this North Carolina bulletin, which is most interesting and timely. Coming as it does when public interest in forest preservation is being awakened in many States, it will stand as a model for future publications of its kind. Mr. Pinchot contributes concise and practical notes on species, giving the general botanical range of each species mentioned, with specific information of development in North Carolina and enough of botanical characters for purposes of identification. The principal commercial species are illustrated with full-page pictures representing the trees as they grow in the forest, together with near views of the trunk. One is impressed by the splendid length of bole of these North Carolina Oaks, Ash and Poplar. One of the best features of the report is the series of maps which present characteristics of distribution graphically.

Mr. Ashe discusses in detail the forests of the State, dividing the commonwealth into three forest areas which run parallel to the sea—the Coastal Plain, the Piedmont and the Mountain Forests. Mr. Ashe's forest descriptions show a great familiarity in the details of his subject, and are most instructive, particularly his treatment of the Pine region, which has been such a source of wealth to the State. He sets forth the present condition of the Longleaf, Shortleaf and Loblolly Pine areas, and indicates plainly the methods by which they may be reforested. It is evident that protection, not only from fire, but from live stock as well, is the first and great necessity for the future well-being of the Pine forests of North Carolina.

The Year Book of the U. S. Department of Agriculture for 1897 has been issued during the month, and, like its predecessors, is full of interesting essays for the farmer and fruit man. Something in the nature of a new feature is a aeview of the work of the Department for the farmer, each Chief of Division detailing what his investigators have done to promote agricultural interests. The article by Dr. B. E. Fernow, who is soon to retire to join the forces of Cornell University, may be considered in the light of a valedictory, and reviews a period of twelve years of active work of which any man might be proud. The Year Book also contains a list of 100 trees most important in forestry, with notes of their distribution, cultural requirements and character and uses of wood.

Forest Preservation in Minnesota. Gen. C. C. Andrews, Chief Fire Warden of

Minnesota, has just issued his Report for 1897, in which we learn that the total area of forest land, including light brush and marsh, burned over in that year was 66,020 acres, causing damage to the amount of $22,455. Sixty-one per cent of the forest fires were extinguished or controlled by fire wardens. In the classification of causes we find 16 fires due to clearing land, 11 to burning brush and meadows, 11 to camp fires and hunters, 3 to locomotives, 21 unknown. Ninety-seven thousand one hundred and forty-six acres of prairie country were burned over, with a total loss of $14,554.

It appears from the report that officers have been active in posting copies of the fire law, but have been derelict in promptly reporting fires and the result of their inquiries into causes. The report shows no cases of prosecution under the law, though this would seem an important part of the duty of the chief warden and his assistants.

Prof. S. B. Green, of the State University, contributes outlines of twenty lessons in forestry for country schools, which are worthy careful reading by pupils of mature years, and should prove very valuable in the hands of intelligent teachers. Much space is devoted to a review of European forestry, and the forestry movement in other States is touched upon briefly. It is a matter of regret that the report throws very little light on the present condition of Minnesota forests, this subject being summarized in a single page.

Forest Leaves, for June, in addition to an extended review of this year's Arbor Day observance, contains excellent articles on the Forest Situation in Colorado and the Teak Wood Forests of Siam, with a full report of Mr. F. H. Newell's lectures before the Franklin Institute of Philadelphia on the Vacant Public Lands and Their Utilization. Dr. Rothrock's contribution is a well-illustrated article on the Yellow Birch. Well-chosen clippings and reviews assist in making an unusually readable number.

We are in receipt of another of the interesting charts of Miss Graceanna Lewis showing a series of leaves and fruit of various species of Oak. These charts, designed for school use, should recommend themselves to all teachers charged with the introduction of nature study.

The State Forest Commissioner of Pennsylvania, Dr. J. T. Rothrock, continues to manifest a keenly intelligent activity in the duties of his office. *The Report of the Commissioner of Agriculture for 1897* has just been issued. Like the Year Book of the Department of Agriculture it is a compendium of pithy articles on various phases of agriculture. Dr. Rothrock's contribution discusses the forestry question from many points of view, but always in a strongly practical way. Taxation of forest property, the treatment of cut-over lands which have reverted to the county for taxes, the control of forest fires, the relation of forests to water flow are all briefly discussed. The paper should prove a strong campaign document before the next legislative assembly. In addition to Dr. Rothrock's paper other articles of interest to forest lovers are Mr. Thos. Meehan's Investigations in the Bark of Trees and Mr. Josiah Hoope's Study of Sex in Plants.

The Annual Report of the Clerk of Forestry for the Province of Ontario for 1898 has just been issued. In addition to an interesting report on the general progress of forestry in the province, it contains brief articles on farm forestry, the Birch family and two forest insects. By far the most valuable article in the volume is the Preliminary Report on Forestry in Ontario, by the Royal Commission appointed in June, 1897, to investigate the subject of "restoring and preserving the growth of White Pine upon lands in the province which are not adapted for agricultural purposes." Residents of the White Pine region in this country will find interesting and valuable information in this brief review of what has been happening in the forests across the line.

Hand Book of Nature Study. By Dr. Lange. Macmillan Co., 1898. Price, $1.

If one were to pick this book up casually and glance through it his first thought would be that it attempts too much. But the author tells us in the preface that it is intended to cover four years of work, and with this idea in mind one can find much to approve. The book is chiefly interesting to THE FORESTER, and finds its chief commendation, in that it seeks to acquaint boys and girls with forest trees and the life of the woods. There is a woodsy spirit about it, which, if the teacher only succeeds in catching, cannot fail to result in interesting class work. The plan of studying trees at different seasons of the year is an excellent one, which might be imitated to good advantage in far more pretentious volumes. One would judge the Basswood and Hackberry to be rather undersized in Minnesota, where Mr. Lange lives, and the twig of Soft Maple foliage, which is illustrated as *Acer dasycarpum,* must have grown on a Red Maple tree; but notwithstanding these slight inaccuracies, the book is very suggestive and should prove a decided help in the vexed problem of the presentation of nature study in the common schools.

The Preliminary Report of the Royal Commission on Forestry in Ontario has been recently issued. The commission was organized July 7, 1897, and this report bears date of December 10, 1897. In the interval the White Pine regions of Canada were inspected, and while a minute examination into silvicultural conditions was not attempted, their investigations were sufficiently technical to warrant the conclusion that with sufficient areas set aside for the purpose and with reasonable care and protection of the younger growth the supply of timber in the province will be vastly augmented. The widely-entertained theory that the White Pine on being cut away is invariably and permanently succeeded by a crop of inferior varieties was completely disproved by frequent instances observed in which tracts of flourishing young Pine trees are growing up on cut-over land. The report reviews, tersely, but graphically, the condition of the cut-over and forest land, and recommends for immediate action that the present system of fire ranging be extended and made more thorough; that the Hudson Bay Company's officials be asked to co-operate in posting fire notices in the Indian language in the northern districts; that license-holders be not permitted to cut trees smaller than twelve inches in diameter at the stump, and that such territory as is generally unsuitable for settlement and yet valuable for growing timber be withdrawn from sale.

Just as we are about to go to press we learn from Prof. F. W. Taylor that a forestry meeting may be held at Omaha, and that Hon. J. Sterling Morton will go on the program in case he is at home, and if not, he has engaged to supply a paper. Hon. Robert Furnas, and Hon. E. F. Stephens of Crete, who has planted more timber claims than any other man in America, and Hon. S. M. Emery, Director of the U. S. Experiment Station at Bozeman, Montana, will also supply papers.

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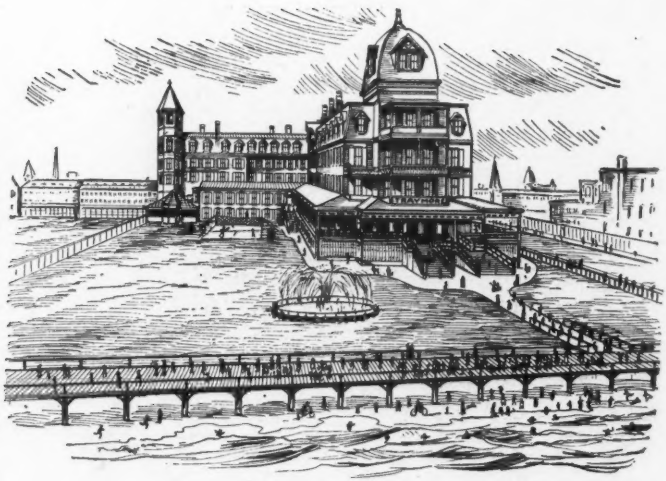

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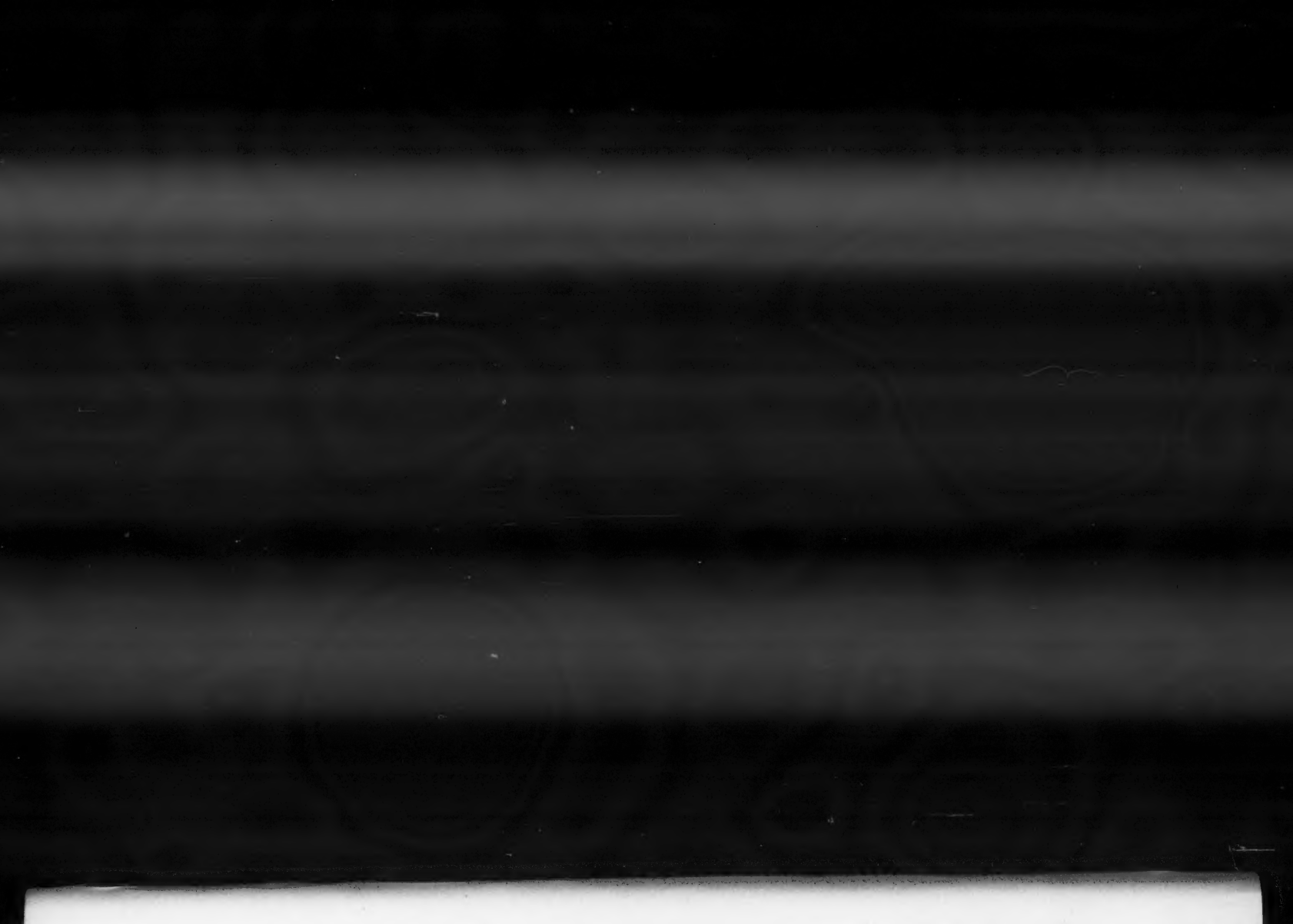
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